

AMENDMENTS IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A transistor structure comprising:
 - a) a central channel region consisting of a first semiconductor lightly doped with a first impurity element to increase first conductivity free carriers;
 - b) a source region and a drain region on opposing sides of the central channel region, both source region and the drain region consisting of the first semiconductor heavily doped with the first impurity element;
 - c) a gate adjacent the channel region and forming a junction with the channel region, the gate comprising the first semiconductor and a second semiconductor with an energy gap greater than the first semiconductor and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.
2. (Original) The transistor structure of claim 1, further including a backgate adjacent the channel region, and on an opposing side of the channel region from the gate, and forming a junction with the channel region, the backgate comprising the first semiconductor and a second semiconductor with an energy gap greater than the first semiconductor and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.
3. (Previously Presented) The transistor structure of claim 2, wherein the first semiconductor is silicon.
4. (Original) The transistor structure of claim 3, wherein the second semiconductor is carbon and the first and second semiconductor form a silicon carbide crystal structure.
5. (Original) The transistor structure of claim 4, wherein the first conductivity free carriers are electrons and the second conductivity free carriers are holes.

6. (Original) The transistor structure of claim 5, wherein the first impurity is arsenic.
7. (Original) The transistor structure of claim 6, wherein the second impurity is boron.
8. (Previously Presented) A silicon on insulator transistor structure comprising:
 - a) an insulating oxide layer separating a device layer of semiconductor material from a bulk semiconductor base region;
 - b) a generally rectangular central channel region within the device layer, the central channel region consisting of a first semiconductor material doped with a first impurity element to increase first conductivity free carriers;
 - c) a source region and a drain region on opposing sides of the generally rectangular central channel region, both the source region and the drain region consisting of the first semiconductor material heavily doped with the first impurity element;
 - d) a gate adjacent the channel region and extending along a side of the central channel region adjacent the source region and forming a junction with the channel region, the gate comprising the first semiconductor material and a second semiconductor with an energy gap greater than the first semiconductor material and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.
9. (Currently Amended) The silicon on insulator transistor structure of claim 8, further including a backgate adjacent the channel region, and on an opposing side of the channel region from the gate, and forming a junction with the channel region, the backgate comprising the first semiconductor material and a second semiconductor with an energy gap greater than the ~~device layer~~ first semiconductor material and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.
10. (Previously Presented) The silicon on insulator transistor structure of claim 9, wherein the first semiconductor material is silicon.

11. (Original) The silicon on insulator transistor structure of claim 10, wherein the second semiconductor is carbon and the first and second semiconductor form a silicon carbide crystal structure.

12. (Original) The silicon on insulator transistor structure of claim 11, wherein the first conductivity free carriers are electrons and the second conductivity free carriers are holes.

13. (Original) The silicon on insulator transistor structure of claim 12, wherein the first impurity is arsenic.

14. (Original) The silicon on insulator transistor structure of claim 13, wherein the second impurity is boron.

15-21. (Cancelled)

22. (Previously Presented) The transistor structure of claim 1, wherein the gate extends the entire length of the channel region between the source region and the drain region.

23. (Previously Presented) The transistor structure of claims 22, further including a backgate adjacent the channel region, extending the entire length of the channel region between the source region and the drain region, on an opposing side of the channel region from the gate, and forming a junction with the channel region, the backgate comprising the first semiconductor and a second semiconductor with an energy gap greater than the first semiconductor and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.

24. (Previously Presented) The transistor structure of claim 23, further including a conductive via electrically coupling the gate to the backgate.

25. (Previously Presented) The silicon on insulator structure of claim 8, wherein the gate extends the entire length of the channel region between the source region and the drain region.

26. (Previously Presented) The silicon on insulator structure of claim 25, further including a backgate adjacent the channel region, extending the entire length of the channel region between the source region and the drain region, on an opposing side of the channel region from the gate, and forming a junction with the channel region, the backgate comprising the first semiconductor material and a second semiconductor with an energy gap greater than the first semiconductor material and being doped with a second impurity element to increase carriers of the opposite conductivity as the first free carriers.

27. (Previously Presented) The silicon on insulator structure of claim 26, further including a conductive via electrically coupling the gate to the backgate.